SHORT COMMUNICATION REPORT

FUNGAL PATHOGENS ASSOCIATED WITH TOMATO WICKER STORAGE BASKETS

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In northern Nigeria, freshly harvested tomato fruits are stored, conveyed and marketed in traditionally weaved wicker baskets. These baskets are often used until they deteriorated including becoming infected with primary fungal spores that might have previously infected the fruits. Kora *et al*. (2005) observed that pathogenic inocula occurring on wooden boxes can initiate disease upon contact with healthy fruits and the practice of reusing infested boxes can affect the fruits in storage.

Post harvest losses in tomato has been reported to be a big problem in Nigeria (Alao 2000), accounting for up to 60 % of the total losses. In 1987, Opadokun estimated that 21% of the potential tomato harvest in Nigeria was lost to rot in the field and additional 5-20 % rotted during marketing. It has also been emphasized that the inoculums responsible for the diseases of tomato in storage basket might have originated from infected and infested farm tools or by wind driving rain (Snowdon 1992), suggesting that post-harvest diseases are threats to the year round availability of quality tomato in the country.

The aim of this research was to access the contribution to post harvest loss of tomato through isolation and identification of the fungal species associated with previously used wicker baskets under room conditions.

Collection and screening of baskets for fungal occurrence: The study was conducted in the laboratories of School of Technology, Kano Nigeria, located on latitude 12°N, longitude 8°34'E. A sample of 10 wicker baskets previously used for the storage and transportation of tomato were collected from Rimi market, Kano metropolis. The market is the second largest tomato market in the State but without any modern storage facility.

Sampling was done by scraping pieces or visible mycelial growth from the surface of the wickers. Samples were transferred and cultured on Saboround's Dextrose Agar (SDA) plates. Cultures were incubated at 22-28 °C for 7 days. Colony counter was used to count the growing isolates. These were then sub-cultured on fresh media, identified and classified based on macroscopic and microscopic examinations (Kora *et al*. 2005).

Mean frequencies of isolates were determined in relation to each of the isolates. The experiment was arranged in a Randomized Complete Block Design (RCBD) with four replications.

Pathogenecity test of isolates on healthy tomato fruits: Intact and matured tomato fruits were surface sterilized with 1 % Sodium Hypochlorite and rinsed with distilled water. One side of each of the replicates was carefully punctured with a sterile scalpel beyond the epidermal layer. The identified isolates were introduced into the punctured portions with a sterile needle and sealed with molten Vaseline petroleum jelly to avoid being contaminated by opportunistic microorganisms. A control was also set up to compare with treatments. All samples were incubated at room temperature (22-28 °C) with enough moisture for 7-days with daily observations for spoilage symptoms.

Occurrence of fungi on baskets

A total of 200 fungal isolates were identified from the 10 wicker baskets and classified into 5 genera namely *Aspergillus* spp., *Alternaria* spp., *Rhizophus* spp., *Penicilium* spp. and *yeast* or *Saccharomyces* spp.

The results showed that the occurrence of these fungal species was heterogeneous (Table 1.0). *Aspergillus* spp. had the highest frequency (25 %) of occurrence followed by *Rhizophus* spp. (23 %). The genus with the lowest frequency of occurrence was *Saccharomyces* spp. (16.5 %).

TABLE 1. FREQUENCY OF OCCURRENCE OF IDENTIFIED FUNGAL ISOLATES FROM THE WICKER BASKETS

Identified genera	No isolates	Frequency (%)
Aspergillus spp.	50	25
Alternaria spp.	36	18
Rhizophus spp.	46	23
Penicillium spp.	35	17.5
Saccharomyces spp.	33	16.5
Total	**200**	**100**

Pathogenecity test of isolates on healthy tomato: The pathogenecity test of the fungal isolates on intact tomato fruits showed that 3 out of the 5 identified genera were virulent and able to cause lesions of varying degrees after 7 days of incubation at room temperature. These were *Alternaria spp., Rhizophus spp*. and *penicillium spp.* Of these, *Penicillium spp*. and *Rhizophus spp*. consistently produced and developed the largest colony followed by *Alternaria spp*. (Table 2).

This study investigated the occurrence of fungal species associated with infested used wicker baskets on healthy tomato fruits under ambient temperatures. The results showed that different species of fungi pathogenic to tomato can live on wicker baskets and cause diseases on healthy tomato fruits.

TABLE 2. INFECTION OF TOMATO FRUITS AND MEAN LESION DIAMETER (MM)

Identified genera	No tomato infected	Diameter of lesion (mm)
Aspergillus spp.	0	0
Alternaria spp.	2	7.7
Rhizophus spp.	4	9.5
Penicillium spp.	4	9.7
Saccharomyces spp.	0	0

Although available literature on post-harvest losses of tomato fruits due to pathogenic fungi is very scanty in Nigeria (Sani 2005) these findings conform to those of Kuku *et al.* (1980) on mould deterioration of vegetables in Northern Nigeria. The result provided further insight into our understanding of the contribution of previously used baskets in transmission of fungal diseases in tomato.

Disinfections of wicker baskets prior to storage and transportation of tomato fruits in any season is recommended as a way of reducing the problem. This can be achieved by steam sterilization of wooden boxes and the use of chemicals such as hypochlorites (Jensen 1971). This will not be an easy task judging our level of development and willingness to comply with advice. More research is therefore needed to develop more reliable, cheap and less risky method of disinfecting the wicker baskets before they are recycled on other fruits. Also, additional studies should be conducted to understand the effects of seasons on the occurrence of these pathogens.

REFERENCES

Alao, S. E. L. 2000. The importance of post-harvest loss prevention. *Paper presented at graduation ceremony of School of Storage Technology, Nigerian Stored Products Research Institute Kano:*1-10

Barksdale, T. H. L. 1972. Resistance in tomato to six Anthracnose fungi. *Phytopathology:*62, 660.

Food and Agricultural Organization (FAO) 1989. *Training manual* F.A.O. Rome. 1989.

Jensen, A. 1971. Storage diseases of carrots, especially *Rhizoctonia* crater rot. *Acta Horiculturae* 20:25-9.

Kora, C., McDonald, M. R. & Boland, G. J. 2005. Occurrence of fungal pathogens of carrots on wooden boxes used for storage. *Plant pathology*, 54:665-670.

Kuku, F. O., Akano, D. A., Olanrewaju, T. O. & Oyeniran, J. O. 1980. Mould deterioration on vegetables in Northern Nigeria. *Nigerian stored product and Research Institute Technical Report No. 8, 1985 Annual Report: 89-94.*

Opadokun J. S. 1987. Reduction of Post-Harvest losses in fruits and vegetables. *Lectures delivered at AERLS/NSPRI Joint National Crop protection workshop, Institute for Agricultural Research, Zaria, Nigeria* :3-26.

Sani, M. Y. 2005. Contributions of harvest and post-harvest handling practices to pathogenic and non-pathogenic loss of vegetables grown in Kano State. M.Sc. Thesis, Bayero University, Kano Nigeria:62pp.

Snowdon, A. L. 1992. Color Atlas of post-harvest diseases and disorders of fruits and vegetables. Volume 2. *Vegetables.* Boca Raton, F.L. USA, CRC press.